Summary

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This summary gives the major points of the Draft Environmental Impact Statement (EIS) prepared for the BPA/Lower Valley Transmission Project by Bonneville Power Administration (BPA). BPA is the lead federal agency on this project and supervises the preparation of the EIS. The U.S. Forest Service is a cooperating agency and assists BPA in EIS preparation. The Targhee and Bridger-Teton National Forests are crossed by BPA's existing transmission line and some of the alternatives.

S.1 Purpose and Need For Action

For Your Information

Words in bold are defined in sidebars.

*A **megawatt** is one million watts, or one thousand kilowatts. A megawatt is enough power to light 10,000 100-watt lightbulbs.*

Four to five megawatts per year is equivalent to about 3-4% load growth per year. Normal growth rates for other areas of the Northwest are closer to 1-2% per year.

*A **kilovolt** is one thousand volts.*

***Voltage** is the driving force that causes a current to flow in an electrical circuit.*

*A **brownout** is a partial reduction of electrical voltages that causes lights to dim and motor-driven devices to lose efficiency.*

*A **blackout** is the disconnection of the source of electricity from all electrical loads in a certain geographical area.*

Lower Valley Power and Light, Inc. (LVPL) buys electricity from BPA and then supplies it to the residences, farms and businesses of the Jackson and Afton, Wyoming areas. Since the late 1980s, LVPL's electrical load has been growing by an average of 4-5 **megawatts** (**MW**) per year, and LVPL expects continued growth at about this rate.

LVPL serves its customers from two 115-**kilovolt** (**kV**) transmission lines. One line, owned and operated by BPA, runs from Swan Valley Substation east to Teton Substation, near Jackson, Wyoming. The second line, owned by LVPL, runs from Palisades Switchyard at Palisades Dam, southeast along the reservoir to LVPL's Snake River Substation. (See Map 1, **Location Map**.) At Snake River Substation, the line splits; one line follows the Snake River most of the way into Jackson, the other runs south to serve the Afton area.

The existing system can reliably serve up to 125 MW of electricity to LVPL, even if one of the lines described above goes out of service. The system is built for that emergency. However, load growth in the Jackson, Wyoming area has passed the 125 MW limit recently. In 1996, the peak climbed to 141.2 MW; in 1997, the winter peak was close to 130 MW. If one of the transmission lines had gone out of service (had an outage) during the winter peaks, **voltage** would have quickly dropped below acceptable levels in the Jackson area and to a lesser extent in the Afton area. Low voltage levels can cause **brownouts**, or under certain conditions, a **blackout**. In a blackout, homes, farms and businesses lose electricity completely.

These conditions can be dangerous to residents, farmers, and businesses, especially in winter. The reliability of BPA's transmission system is critical to LVPL's system. The transmission system that serves the Afton and Jackson, Wyoming areas needs to be reinforced as soon as possible to maintain voltage stability.

BPA will use the following purposes to choose among alternatives:

- Maintain environmental quality;
- Minimize costs while meeting BPA and LVPL's long-term transmission system planning objectives for the area;
- Maintain BPA and LVPL transmission system reliability.

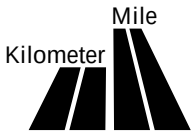
S.2 Alternatives

BPA and LVPL have been studying ways to reinforce the transmission system that serves the Jackson and Afton, Wyoming areas. Each alternative has different components and ability to solve the problem.

S.2.1 Agency Proposed Action

For Your Information

BPA uses metric measurements to comply with Public Law 100-418. See metric conversion chart on the inside of the back cover.



In the Agency Proposed Action, BPA and LVPL would construct a new 115-kV line from BPA's Swan Valley Substation near Swan Valley in Bonneville County, Idaho about 58 km (36 miles) east to BPA's Teton Substation near Jackson in Teton County, Wyoming. (See Map 1.) The Agency Proposed Action has the following components and would cost about $14,500,000 (1997 dollars). The cost, including all potential future planning actions, is estimated to be $19,400,000 (1997 dollars) over 30 years.

S.2.1.1 Transmission Line

*A **single-circuit** line has one electrical circuit on one structure.*

A new 115-kV line would be built next to the existing Swan Valley-Teton No. 1, 115-kV transmission line wherever possible. Most of the new line would be supported by a mix of **single-circuit** wood pole H-frame structures and lattice steel structures. Steel structures are generally stronger than wood structures and would be used in areas where greater strength is needed, such as in steep areas, or for long spans over deep canyons.

*A **double-circuit** line has two separate electrical circuits on the same structure.*

At Teton Pass, and coming off Phillips Ridge into Teton Substation, **double-circuit** structures would be used.

S.2.1.2 Additional Right-of-Way (ROW)

About 23 m (75 feet) of additional ROW width would be needed for the new structures and line. In areas where double-circuit structures would be used, no additional ROW would be needed. New ROW is proposed for the north side of the existing ROW except for the following areas:

- Through the Swan Valley area and into the mouth of Pine Creek, the new ROW could be east or west of the existing line.
- In the Pine Creek area, BPA is considering several routing options described below.
- Through the Pine Creek area to the Idaho State Route 33 crossing, the new line would be south of the existing ROW.

Pine Creek Routing Option A — BPA would place the new transmission line north of the existing line, up the hill about 244 m (800 feet) or more.

Pine Creek Routing Option B — BPA would place the new transmission line next to and north of the existing line.

Pine Creek Routing Option C — BPA would cross the highway, route the line on the south side of Pine Creek up the hill behind the old ski lodge and tie into the existing ROW on the south side of the existing ROW.

S.2.1.3 Access Roads and Gates

Most of the new line could be built using existing access roads. A full field survey of the existing and required new access would be done prior to construction.

About 8-16 km (5-10 miles) of new access road (not including spur roads) would be needed for construction and maintenance for the new and existing lines. The easements for new access roads outside the existing ROW would be 15 m (50 feet) wide. New or existing roads would be graded to provide a 4.2 m (14 foot) travel surface, with an additional 1.2-1.8 m (4-6 feet) to accommodate curves. About 3 m (10 feet) on both sides of the road would be disturbed for ditches, etc.

Access roads that cross private land and land managed by the Forest Service are typically gated and locked by BPA. Gates are constructed of heavy pipe and painted to the landowner's or land manager's preference. All parties that have a right to use the road would have access to it. At this time, BPA estimates installing about 19 gates.

S.2.1.4 Line Termination and Equipment

The new line would terminate at Swan Valley and Teton substations. Terminating a line requires special types of equipment. All new equipment would be placed on BPA property. All equipment would be placed within the substation yard at Teton Substation. The fenced yard at Swan Valley Substation would be expanded east into an existing parking lot.

The following equipment would be installed at Swan Valley and Teton substations: power circuit breakers, substation dead ends, transmission dead end towers, **ground wire**, a substation fence, substation rock surfacing, disconnect switches, bus tubing, and bus pedestals.

For Your Information

Ground wire *is wire that is strung from the top of one structure to the next; it shields the line against lightning strikes.*

Underground Line Termination Option at Teton Substation - This option would place the last 122 m (400 feet) of new transmission line underground into Teton Substation. No new substation and transmission line dead-end structures would be needed and the tallest piece of equipment in the new bay would be under 6.7 m (22 feet).

This option could cost about $250,000 depending on final design specifications and cost of cable, hardware and labor.

S.2.1.5 Communication Equipment

BPA has an existing communications network in place that delivers signals from control centers to operate substation equipment in remote locations. This network also provides voice communication for substation operators and maintenance personnel. BPA uses a combination of fiber optics, microwave, and radio communication at Swan Valley Substation. For Teton Substation, BPA uses the transmission line as a carrier for communication signals.

BPA is considering installing fiber optic cable on the new line for communication. If ground wire is installed along the entire line, the fiber optic cable could be contained within the ground wire.

S.2.1.6 Maintenance

BPA would perform routine, periodic maintenance and emergency repairs on structures, substations, and accessory equipment. If BPA develops access to most or every structure, this access would remain through the life of the line so BPA can perform routine and emergency maintenance.

Another large part of maintenance activities is vegetation control. A new ROW Management Plan would be developed within a year of project completion that addresses how BPA would maintain the line, including methods used to manage vegetation. At that time BPA would work with the Forest Service to identify the manual, mechanical, biological, and chemical methods needed to manage vegetation. Additional site-specific environmental work would be completed at that time.

S.2.2 Single-Circuit Line Alternative

The Single-Circuit Line Alternative has all the components of the Agency Proposed Action except the entire line would be supported by single-circuit structures and located on the north side of the existing ROW. Also, this alternative does not include the Pine Creek Routing Options or the Underground Line Termination Option at Teton Substation.

This alternative would cost about the same as the Agency Proposed Action ($14,200,000 [1997 dollars]). The cost including all potential future planning actions is estimated to be about $19,100,000 (1997 dollars) over 30 years.

S.2.3 Short Line Alternative

For Your Information

Tap *- The point at which a transmission line is connected to a substation or other electrical device to provide service to a local load.*

The Short Line Alternative has all the components of the Single-Circuit Line Alternative from Targhee **Tap** to Teton Substation. BPA would also construct a new switching station near the existing ROW north of Targhee Tap. Targhee Tap would then be removed. The new station location is shown on Map 1. The new switching station would cover about 0.4 hectares (1 acre) and would be similar to Teton Substation, which has three bays now and would add one more. BPA would purchase about 1-2 hectares (3-5 acres) of agricultural land. A parking area, entrance road, electrical service, and a small control house would also be needed.

This alternative would cost about $11,100,000 (1997 dollars). The cost including all potential future planning actions is estimated to be about $19,300,000 (1997 dollars) over 30 years.

S.2.4 Static Var Compensation Alternative

*A **var** is a unit of measurement of reactive power in a circuit.*

__Thyristors__ are semiconductor switches.

BPA would install a Static **Var** Compensator (***SVC***) at Teton or Jackson substations. (See Map 1.) An SVC is a group of electrical equipment placed at a substation to help control voltage on a transmission system. Equipment includes a transformer, capacitors, reactors, **thyristor** valves, a cooling system, and computer controls. Some components are housed together in a small building at the substation and others remain outside in the substation yard.

Teton Substation is the preferred location for the SVC because it is BPA-owned. Jackson Substation is owned by LVPL and would need to be expanded about 0.2 hectares (0.5 acre) to house the new facility.

This alternative would cost about $6,200,000 (1997 dollars). The cost including all future planning actions is estimated to be about $20,100,000 (1997 dollars) over 30 years.

A portion of the west fence line at Teton Substation would be moved on existing BPA property for the new equipment, which would require about 46 m x 46 m (150 feet x150 feet) of added space. Jackson Substation would require the same equipment.

S.2.5 No Action Alternative

The No Action Alternative assumes that no new transmission line is built, and no other equipment is added to the transmission system. The existing transmission line and substations would be operated and maintained as they are now.

S.2.6 Alternatives Considered and Eliminated from Detailed Consideration

BPA and LVPL studies a variety of alternatives to meet the need including conservation, other transmission plans, burying the transmission line, local generation, and other substation locations. After study, the alternatives were eliminated from further consideration because they either could not meet the need for the project or they were considered unreasonable.

S.3 Affected Environment

The project area is in the uppermost reaches of the Columbia River Basin, within the Snake River watershed. It is part of the Greater Yellowstone Ecosystem, centered around Yellowstone and Grand Teton National Parks and includes the national forests, wilderness areas, wildlife refuges, and other federal, state, tribal, and private lands that surround these parks.

The landscape is scenic. Dominant features include mountain ranges over 3,660 m (12,000 feet) high, alpine valleys, rivers, broad flat plateaus, picturesque farmlands, and the special features of the national parks. The region is known for its variety of wildlife, unequaled elsewhere in the continental United States. Species present in large numbers include bighorn sheep, pronghorn antelope, moose, mule deer, elk, and black bear. Wolverines, grizzly bears, and reintroduced wolves are present as well.

Visitors and local residents enjoy sightseeing, hiking, alpine and nordic skiing, snowmobiling, camping, backpacking, horseback riding, mountain biking, snowboarding, parasailing, hunting and fishing.

S.3.1 Land Use

About 84 percent (52 km [30 miles]) of the existing ROW is on the Targhee and Bridger-Teton National Forests. The existing ROW crosses about 6.4 km (4 miles) of productive cropland on the west end of the ROW in Bonneville County, Idaho, and about 1.6 km (1 mile) of dryland and irrigated pasture at the east end of the ROW in Teton County, Wyoming. Three existing substations are in rural, residential and mixed use (residential and commercial) areas.

S.3.2 Visual Resources

The area's visual character and quality are recognized as an important resource at national, state, and local levels, and tourists from around the world come to see nearby natural features.

The existing ROW begins at Swan Valley Substation and runs for about 6.4 km (4 miles) through rural, rolling open agricultural lands with scattered ranches.

The ROW then follows the general contours of the land instead of cutting a straight swath through rolling and mountainous terrain. No long stretches of line follow the top of a ridgeline where the line would be dominant. In general, the existing ROW is well sited on the landscape about one-third of the way up forested slopes, with a buffer of vegetation between the ROW and roadways.

Near Teton Substation, the ROW descends into the scenic Wilson Valley, an area of rural-residential and scattered, resort-like developments.

S.3.3 Recreation Resources

In most cases the existing ROW follows roads that are a common route for tourists traveling through the region and visiting national parks and monuments.

Tourists and sightseers commonly travel along State Routes 31 and 33, portions of which are designated Idaho Scenic Byways. The existing transmission line is currently visible from these roads in many locations. The ROW is noticeable in the middleground and background of most views but is not at any time a dominant feature.

Sightseers travel to the top of Teton Pass and spend time at pullouts next to the road viewing vistas across the mountains and down into Jackson Valley. The existing ROW is noticeable in the middleground and background of the view but is not the dominant feature.

Motorists, hunters, anglers, parasailers, snowmobilers, and mountain bikers use USFS roads that access or are within the existing ROW.

Nine trailheads are close to the existing ROW. In all areas except Teton Pass, hikers, backpackers, horseback riders, mountain bikers, and cross-country skiers cross under the existing line briefly as the trail leads away in a perpendicular direction from the line. In some cases hikers and backpackers use the existing ROW access roads for hiking.

Teton Pass is a high recreation use area. Hikers and backpackers have access to a number of backcountry trails.

Five developed campgrounds were inventoried within sight of the existing ROW. Campers use tents, pop-up trailers, and RVs at these campgrounds.

Alpine and nordic skiers, and snowboarders also use natural bowls on both sides of Teton Pass. On the eastern side of the pass, skiers ski down the face of the mountain, under the transmission line, then follow the abandoned State Route 22 roadbed to the bottom of the hill.

S.3.4 Public Health and Safety

Transmission facilities provide electricity for heating, lighting and other services essential for public health and safety. These same facilities can potentially harm humans. Contact with transmission lines can injure people and damage aircraft.

Transmission lines, like all electrical devices and equipment, produce electric fields and magnetic fields (EMF). The strength of magnetic fields depends on the design of the line and on distance from the line. Field strength decreases rapidly with distance.

For Your Information

***Corona** is a discharge, often glowing, at the surface of a conductor or between two conductors of the same transmission line.*

Audible noise can be produced by transmission line **corona**. It is usually associated with higher voltages.

Teton Substation is surrounded by a residential neighborhood and agricultural land. As a result, the site is relatively quiet, as quiet as a normally quiet office.

Jackson Substation is located on a busy road and surrounded by mixed use residential and commercial businesses.

The Targhee National Forest has had significant timber harvest activities and both national forests have maintained aggressive

wildfire suppression activities within non-wilderness lands. Because of this, most forested stands are mature and vulnerable to large fires, disease problems, and insect infestations.

S.3.5 Water Quality, Soils and Geology

The surface water in the area is of sufficient quality to support a number of uses including fish and wildlife habitat, agriculture, and recreation. Groundwater quality is generally good to excellent throughout the area. Groundwater is a supplemental source for irrigation water in the region.

Diverse landforms and geologic features exist within the project area. From Swan Valley Substation, at an elevation of 1700 m (5600 feet), the existing ROW crosses a broad level slope extending from the base of the Snake River Range. Known as the Pine Creek Bench, the deep soils are used extensively for dryland farming.

The Snake River Range trends southeast to the Teton Range and is characterized by long parallel ridges cut or separated by valleys and canyons. The mountains are made of folded sedimentary rock that has been pushed eastward upon low angle fault planes. Erosion has worn away the less resistant rock layers, leaving the harder rocks standing as ridges. Soils have formed in materials derived from these sedimentary rocks, including limestone, dolomite, sandstone and shale.

The Tetons, one of the youngest ranges in the Rocky Mountains, abuts the Snake River Range near Teton Pass. Sedimentary rocks are exposed on the western slopes, forming cliffs of stratified rocks.

Much of the landscape reflects the impact of past glaciation. Geologic hazards include landslides, avalanches, seismic risk, steep slopes and erosion.

S.3.6 Floodplains and Wetlands

The existing ROW crosses areas that have been identified as 100-year floodplains on Flood Insurance Rate Maps. The 100-year floodplains crossed by the existing ROW and/or existing access roads are:

- Pine Creek: T2N, R43E, Sec. 14; T2N, R44E, Sec. 6; T3N, R44E, Sec. 31; T3N, R44E, Sec. 29; T3N, R44E, Sec. 28
- Trail Creek, Idaho: T3N, R46E, Sec. 30
- Fish Creek: T41N, R117W, Sec. 2
- Lake Creek: T41N, R117W, Sec. 2.

Two major drainages support riparian wetlands: Pine Creek, which drains into the Snake River; and Trail Creek, which drains into the Teton River. These wetlands are characterized by *Salix* (willow) species and have an understory dominated by sedges and grasses. Wet meadows characterized by *Carex* (sedge) species are also found in the project area.

There are also wetlands associated with Fish Creek and Lake Creek by Teton Substation.

S.3.7 Vegetation

The vegetation in the region is a diverse mix because of topography, climate, aspect, and soils. Most of the existing ROW is mountainous with steep slopes. Disturbances such as fire, disease, grazing, and clearing (for roads, timber harvest, campgrounds, etc.), as well as natural disturbances such as avalanches and landslides, have helped determine vegetation cover types.

Forests of mixed conifer cover types are dominated by Douglas fir and lodgepole pine, with Engelmann spruce, subalpine fir, and whitebark pine mixed in at upper elevations. Cottonwoods and aspens are the most common deciduous species. Open areas with juniper and rock outcrops are also in the area.

Shrubland cover types include mountain brush, sagebrush, and riparian scrub.

Grasses, forbs, and short shrubs make up much of the existing ROW because of maintenance practices to keep the ROW free of trees and tall shrubs.

S.3.8 Wildlife

Open cropland near Swan Valley Substation supports many birds, most notably a number of hawks (Northern harriers and red-tails) and owls.

The Pine Creek area could be used by nesting raptors and other wildlife associated with riparian zones such as breeding songbirds, amphibians, and reptiles. The lower Pine Creek basin is used as transitory range during spring and fall for deer and elk. The Pine Creek benches of Swan Valley and the Rainey Creek feeding ground are wintering areas for deer and elk. Sandhill cranes may travel into Pine Creek drainage during mid-to-late summer with their young. Both bald eagles and peregrine falcons occasionally use Pine Creek drainage, and the area could be used as a flyway by trumpeter swans and other waterfowl between Swan Valley and the Teton Basin.

Occasional rock outcrops near the ROW could contain habitat for hawks and other birds to nest and perch, roosting habitat for bats, and habitat for other birds, mammals, and reptiles.

Fire suppression has created a large proportion of dense stands of mature lodgepole pine and Douglas fir. This habitat is used by many species including cavity-nesting birds, such as woodpeckers and nuthatches. Northern goshawk, a USFS sensitive species, could forage and nest in these surrounding forests.

The ROW crosses northwest to southeast-oriented ridges and hilltops with open juniper and aspen shrubland on their southwest slopes and along ridgetops. These open areas provide good deer and elk summer habitat, and habitat for birds favoring open habitats, including ravens, great horned owls, and red-tailed hawks.

Teton Basin is important waterfowl habitat, including wintering habitat for trumpeter swans and breeding and migratory habitat for sandhill cranes. The habitat near the ROW is at a transition point between forest and agricultural habitat types and may be used by many species.

Alpine habitats near Teton Pass are known habitat for boreal owl, pika, and wolverine (a rare species reported at Teton Pass). The eastern portion of the pass is a USFS-designated wildlife viewing area.

Going east from Teton Pass the habitat is potentially suitable for boreal and great gray owls, and other mountain birds, including Clark's nutcracker, rosy finch, white-crowned sparrow, and broad-winged hummingbird.

The area near Fish Creek and associated tributaries are suitable for willow flycatchers, sparrows, warblers, American white pelican, Barrow's and common goldeneye, common merganser, and bufflehead. Waterfowl including Canada goose, trumpeter swan, green-winged teal, and American widgeon and bald eagle and osprey use the agricultural fields and the associated wetlands and riparian habitats. Moose also winter here.

Bald eagles are federally listed as threatened in Idaho and Wyoming and state-listed as endangered in Idaho. Bald eagles are more likely to occur in the vicinity of the existing ROW during October through March because resident breeding pairs are more likely to wander during winter, and migrating or wintering eagles move into the Swan Valley area. The eagles are mostly found along the Snake River, and occasionally venture into its tributaries, including Pine and Rainey creeks.

Peregrine falcons are listed as endangered in Idaho and Wyoming on federal and state lists. No peregrine falcon nests occur within or next to the existing ROW. The closest peregrine nest site is in Swan Valley, Idaho, on the south side of the Snake River, about 3 km (2 miles) south of the Swan Valley Substation.

The most likely places for peregrine falcons to occur are in the Swan Valley and Jackson areas especially near the Snake River, where waterfowl and other potential prey are concentrated.

S.3.9 Fisheries

The only indigenous trout in the streams and rivers of the project area is the finespotted cutthroat trout (a form of the Yellowstone cutthroat trout), which is a USFS sensitive species. Other trout, including rainbow, German brown, and brook trout, have been introduced to many of the drainages in the region, but few populations of these introduced species persist in great numbers. Other fish species in the region include mountain whitefish, bluehead suckers, Utah sucker, redside shiners, longnose dace, and mottled and Paiute sculpin.

S.3.10 Cultural Resources

There has been prehistoric and historic activity in the project area. However, only a small amount of land in and near the project area within Idaho and Wyoming has been inventoried and, likely, only a small fraction of the existing prehistoric and historic sites have been recorded.

For Your Information

Lithic *means associated with stones or rock.*

Lithic ***scatters*** *are prehistoric sites, generally lacking cultural features or significant cultural depth, having a scatter of flakes and lithic debris which provide evidence of lithic reduction and/or temporary occupation activities.*

In Idaho, eight prehistoric sites within one mile of the existing ROW are recorded. They include seven **lithic scatters**, with no associated features or diagnostic tools, and a series of campsites. The campsites were recorded as one site, with no specific data about features and artifacts.

Twelve prehistoric sites within one mile of the existing ROW were recorded in Wyoming. Ten lithic scatters and a series of hunting blinds are in mountainous areas.

Twenty historic sites found within one mile of the existing ROW in Idaho include historic trash associated with a former USFS ranger station, a lime kiln and quarry, an historic ferry across the Snake River, and 17 habitation sites including at least 16 houses and one cabin. There is limited information on most of these recorded sites.

Three historic sites found in Wyoming reflect the sparse, limited historic use of much of the project area. At one time there was a bridge over Fish Creek in the Jackson area, and a road house near Teton Pass. An irrigation ditch that runs through the Jackson area is still being used.

S.3.11 Socioeconomics

The socioeconomics of the project area are influenced heavily by its geography and geology, particularly the spectacular beauty of the world renowned public lands, and the industries that exist because of it. Agriculture, mining, ranching, lumber and wood products, recreation, and tourism all are important industries in the region that result from the physical characteristics of eastern Bonneville County, Idaho and western Teton County, Wyoming.

S.3.12 Air Quality

The Swan Valley airshed has no significant air quality problems. The Teton Valley airshed has little trouble with air pollution problems because frequent southwest airflow prevents pollution buildup.

For Your Information

Particulate matter *is airborne particles including dust, smoke, fumes, mist, spray, and aerosols.*

During January through April, the Jackson airshed can become inverted and suspended **particulate matter** can negatively affect local air quality. The Department of Environmental Quality has concluded that the particulate matter problem in downtown Jackson is primarily due to road dust.

There are several protected airsheds in the vicinity of the project area. These airsheds include national parks and wilderness areas.

S.4 Impacts

This section compares all the alternatives using the project purposes and the predicted environmental impacts.

S.4.1 Agency Proposed Action

S.4.1.1 Environmental

This alternative was developed to meet environmental concerns expressed by the public and the USFS during scoping. Scenic vistas, winter and summer recreational use, and habitat disruption and recovery strongly influenced BPA and LVPL to create the new Agency Proposed Action. The addition of double-circuit structures and varying the location of new ROW makes the Agency Proposed Action more responsive to these concerns than other alternatives.

Construction, operation and maintenance activities would create levels of impacts that range from no impact to moderate impact for most resources. Agricultural land, timberland and rangeland would be taken out of production. Impacts would be low to moderate. Impacts to visual resources would generally be low or moderate, but high impacts would occur to visual resources at Teton Pass and near Teton Substation. Construction could interfere with recreation temporarily, and some roads open to public could be gated and closed after construction. Magnetic field levels near Teton Substation would decrease relative to the No Action Alternative. Impacts to water quality and soils range from no impact to high impacts and the degree is dependent on the type of soil affected and the success of erosion control measures. Erosion control measures would also be needed to protect wetlands. Impacts to vegetation would be moderate to high depending on the amounts cleared and the ability of an area to revegetate. Impacts to wildlife range from none to moderate. Bird collisions could be increased if mitigation measures are not used. Impacts to fish range from low to moderate and depend on impacts to stream turbidity. The potential to find cultural resources is low. Construction would create a positive impact on employment for the local economy. Impacts from vehicle emissions and construction dust are expected to be low.

In the Pine Creek area, three options included in the alternative respond to USFS concerns about wetlands, new access roads on steep slopes, and visual impacts.

Option A would avoid impacting wetlands. New access roads would be needed. Impacts to water quality and soils would be moderate to high. Option A would result in slightly greater impacts to visual resources than following the existing line. The line would be visible for a short distance along Highway 31, would add a cleared ROW in the area, and campers from the nearby day camp would view two rights-of way instead of one. Creating new ROW could impact hawk nests or other bird nests in cliff habitat.

Option B would also avoid wetlands, but new access roads would be needed. Construction would cause direct impacts including an increase in runoff and erosion and possible destabilizing of slopes. Impacts to soils would range from moderate to high depending on final design and location and the success of mitigation measures. Impacts would be reduced if access roads are not constructed and materials are delivered by helicopter or winched to structure sites. The new ROW would not create a high visual impact because the line would parallel the existing line. However, the rugged rocky cliffs would be slow to revegetate so the line would not be screened for a longer period. This option would remove fewer trees and would have fewer impacts to wildlife.

Option C would also avoid wetlands, but the new ROW would be more visible than the other options. This option would be more visible from Highway 31, particularly westbound. Also, a stream crossing and new access roads may be needed. Roads would be developed both on and off the ROW for this option, and existing roads would be used where practical. Impacts would be moderate and include increased erosion levels and runoff. Wetlands could be impacted by erosion created by construction of new roads if recommended mitigation measures are not successful. This option could create an additional hiking route around the south side of the day camp and could provide additional hiking access to Pine Creek at the new highway crossing. This option would increase the risk of avian collisions because there would be greater spacing between the existing and proposed lines.

The Underground Line Termination Option would reduce visual impacts somewhat to residences immediately adjacent to the substation. New equipment would be shorter than the equipment required for an overhead line and would be better screened by the fence and surrounding landscaping. There would be taller structures added just prior to the line going underground. This option would not impact recreation. Soil impacts would be primarily related to excavation activities to put the line underground from structure 36/4 to the line's end. About 4900-6100 m^3 (6400-8000 yds^3) of soil material (mostly within the existing substation) would be disturbed by the trench. The site is level and the risk of runoff and erosion is slight. The risk of off-site transport of sediment would be greatest during excavation and construction when soil is exposed. If turbidity is increased in tributaries to Lake Creek, there would be a localized, low impact to fish.

S.4.1.2 Reliability

The Agency Proposed Action is slightly less reliable than the Single-Circuit Line Alternative because some double-circuit structures would be used and separate lines on separate structures are safer in avalanche and slump prone areas. Steep terrain and extreme weather conditions in the project area combine to increase avalanche hazard and the certainty that both lines would go out of service if a double-circuit structure goes down. However, this alternative meets BPA's standards of providing power to LVPL with a high probability that power would be available when LVPL needs it.

For Your Information

Line loss *is the power lost during the transfer of power from one place to another. More power moved over a smaller number of lines increases line loss.*

S.4.1.3 Cost

This alternative has fewer transmission ***line losses*** than most alternatives. This helps make the line more economical to build

over the long term. There is an estimated $300,000 difference in both up-front and long-term costs between the Agency Proposed Action and the Single-Circuit Alternative. Higher material and labor costs associated with double-circuit structures would make the up-front costs slightly higher. The margin of error present in the calculations to do the 30-year costs essentially makes the long-term costs about the same. Also, over a 30-year period this alternative would cost about the same to build as the Short Line and slightly cheaper to build than the SVC Alternative.

S.4.2 Single-Circuit Line Alternative

S.4.2.1 Environmental

Environmental impacts are similar to the impacts from the Agency Proposed Action. Slightly more land would be taken out of production permanently where the single-circuit structures are used instead of double-circuit structures. Magnetic fields would decrease on the south side and increase on the north side of the ROW relative to the No Action Alternative.

S.4.2.2 Reliability

This alternative is the most reliable of all the alternatives. It meets BPA's standards of providing power to LVPL with a higher probability that the power would be available when LVPL needs it. Separate lines on separate structures are safer in avalanche and slump prone areas.

S.4.2.3 Cost

This alternative also has fewer transmission line losses than most alternatives. This helps make the line more economical to build over the long term. Like the Agency Proposed Action, this alternative would be initially more expensive to build but over a 30-year period, it would cost about the same to build as the Short Line and slightly cheaper to build than the SVC Alternative.

S.4.3 Short Line Alternative

S.4.3.1 Environmental

Impacts would be similar to the Single-Circuit Line Alternative east of Targhee Tap. A new switching station built on agricultural land would permanently remove some land from production. The switching station would be located to minimize visual impacts. No recreation impacts are expected at the switching station.

Magnetic fields would decrease on the south side of the ROW near Teton Substation and increase on the north side relative to the No Action Alternative.

S.4.3.2 Reliability

This alternative is not as reliable as the Agency Proposed Action or the Single-Circuit Line Alternative. Some reliability is compromised if the existing Swan Valley to Teton line goes down because power would need to flow north to Drummond and back down to Jackson. It is more reliable than the SVC Alternative.

S.4.3.3 Cost

The Short Line Alternative is a short-term fix to the problem. Though up-front construction costs are less than the Agency Proposed Action or the Single-Circuit Line Alternative, over the 30-year planning period it costs about the same to build the Short Line Alternative because by 2020, the line would need to be extended from Targhee Tap to Swan Valley Substation. Over 30 years, costs are less than the SVC Alternative.

S.4.4 SVC Alternative

S.4.4.1 Environmental

The SVC Alternative has the lowest overall environmental impacts and the impacts that do occur are concentrated in the residential and commercial areas that surround the substations under consideration. Visual impacts would be high to most residents surrounding Teton Substation. Impacts would be low at Jackson Substation because the substation is in a mixed use (residential and commercial) area. Noise would increase depending on background noise and equipment operation, but would stay within local standards. The potential to find cultural resources is low. Socioeconomic impacts would be similar to the Agency Proposed Action. No impacts to land use, floodplains and wetlands, wildlife, fish, and air quality are expected.

S.4.4.2 Reliability

The SVC Alternative would be a short-term solution to the problem. This alternative may not be as reliable as the transmission line alternatives. Because the SVC Alternative consists of electrical equipment, there are more switching mechanisms and moving parts. This may require more emergency

maintenance compared to a line that has more routine, scheduled maintenance. As a result, the line is more likely to be available when it is needed.

S.4.4.3 Cost

The SVC has more line losses than the other alternatives. It has significantly lower up-front costs than other alternatives but over the 30-year planning period it becomes the most expensive alternative because of the need to build a transmission line from Swan Valley to Teton Substation in 2007.

S.4.5 No Action Alternative

S.4.5.1 Environmental

The No Action Alternative would avoid all of the environmental impacts of the construction alternatives but commerce and industry would be negatively affected as the quality and reliability of power decreased. The socioeconomic and public health and safety impacts of this alternative would be immediate and more negative than the other alternatives.

S.4.5.2 Reliability

The No Action Alternative is the least reliable alternative and would lead to voltage collapse if a critical line is lost on the system. Collapse of the system could continue over a long period (hours or even days) if outages occur in winter when deep snows make access to the existing transmission system difficult.

S.4.5.3 Cost

Depending on the frequency, duration, and extent of blackout conditions in the area, this alternative could be the most costly in the long run.